

REMARKS

The Examiners rejection of indefiniteness under 35 U.S.C. 112 is traversed.. A pore is an empty cavity. Thus there is no new matter added to the application. If a pore were not empty it could not be open nor could there be flow therethrough. With regard to the term “substantially empty cavities”, it means that the cavities are not filled with liquid or solid material. If a material has a pore size, it means to anyone skilled in the art that these are empty areas or cavities within the material. Thus, claims 18-21 are not indefinite under 35 USC 112, second paragraph. Claim 10 and 13 have been amended to overcome the other indefiniteness rejection..

Claims 1-22 were rejected by the Examiner as being obvious under 35 USC 103(a) in view of the combined references of Bahten 6,079,662 with Rosenblatt 4,098,728 and Tomita et al. 4,566,911 .

The Declaration of Thomas J. Drury in the Preliminary Amendment (Exhibit 1 with attached Exhibits A, B and C.) is a verbal summary analysis of a product testing conducted by independent third parties. Exhibit A is a test of applied Materials, a corporation who has leading edge skill and knowledge in the field and ranks as one of the top companies in the world, in the production of silicon wafer processing equipment. This formal test result on the inventive polyvinyl acetal roller, (3920 - 00307 Type 212) by an entity which would be most critical of the results as they are manufacturer of silicon wafer processing equipment, as the rollers have a direct bearing on the warranty of the equipment. The recommended product life of the rollers used in the manufacturers machines show conclusively that the present invention has three surprising results over the roller products currently being used; (1) the doubling of the effective use life of the roller; (2) a minus defect rate; and (3) a significant reduction of chemical and water usage, any one of which would be a surprising or unexpected result. **A minus defect rate means that the inventive rollers cure manufacturing defects which occur in other areas of the chip manufacture.** The prior art rollers used during the chip cleaning process have positive defect rates meaning that certain percentages of chips were rendered unsuitable for use because of the damage caused by the roller and associated chemical and water used in cleaning. Other testing and comment by those skilled in the art are attached in the declaration as Exhibits B and C.

Some patents (Bahten) use starch for the pore former while others (Rosenblatt, Cercone) use air as the pore former. These different pore formers are not and cannot be combined. The invention combines all of the good physical attributes of a starch (finite sized pore former) based product such

as that made under Bahten with the good attributes of a gas or air (strength, durability) formed product Rosenblatt, Cercone, to produce a product superior to any of the cited prior art. The production of roller products is either by starch or by air and the same are not combined in the manufacturing process.

The Rosenblatt 4,098,728 patent refers to an air or gas formed polyvinyl acetal sponge product with a very wide range of pore size. Rosenblatt only teaches forming pores with a gas and does not teach controlled uniform pore size and uniform pore distribution, contrary to the assertions of the Examiner. The previous cited Cercone '573 patent is an extension of the Rosenblatt '728 technology. The fact that the pore range is so wide, means that the pore size is not controlled. A range of 10 to 200 microns produces an inconsistent product with various pore wall thicknesses. Rosenblatt '728 has pore sizes ranging between 0.1mm to 4.0 mm (Example 1: 0.1mm -0.5 mm; Example 2: 0.3mm - 1.0 mm; Example 3: 0.5mm - 4.0 mm; Example 6: 0.25mm - 1.75 mm) Thus Rosenblatt '728 discloses a roller having a pore size ranging from 100 to 4,000 microns. With Rosenblatt '728, the pore size can not be controlled in a tight range. (See Rosenblatt '728 Col. 5 Ins 28 - 40) The more open the range the greater the variability. In forming the product into a cast or molded form, these variable pores collapse on the surface and form an inconsistent skin on the surface of the sponge which is shown by Figure 4 of '573 Cercone et al and clearly teaches away from the present invention. This negatively impacts the flow rate and the surface properties of this type of roller/brush which is prone to have variable cleaning capability. In use, these brushes have even scratched the surface of the wafers rendering them useless. This product has not been readily accepted by users in the market place.

Applicant is completely familiar with Rosenblatt and Cercone having worked with both of them for a number of years.

In cases which are similar to the present circumstances, the courts have ruled that beyond looking at the prior art to determine if it suggests doing what the inventor has done, one must consider if the prior art provides an expectation of succeeding in the endeavor. *In re Dow Chem.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988), "Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure." Id. As noted by the court in the case of *In re Clinton*, "Obviousness does not require absolute predictability, but a reasonable expectation of success is necessary." *In re Clinton*, 527 F.2d 1226, 1228, 188 U.S.P.Q. 365, 367 (C.C.P.A.1976).

As noted by the Court in the case of *In re Gordon*, the mere fact that a prior art reference could be modified to achieve the claimed invention does not make the modification obvious unless the prior art suggested the desirability of the modification. *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984); see also *In re Laskowski*, 871 F.2d 115, 117, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989), and *Ex parte Levengood*, 28 U.S.P.Q.2d 1300, 1302 (Bd. Pat. App. & Int. 1993). Applicants respectfully submit that nowhere in the art of record is there any suggestion to arrive at the claimed novel structure of the present invention.

The court in *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 24 USPQ2d 1321 (Fed. Cir 1992) held that: "Although [a patent's] specific claims are subsumed in [a prior art reference's] generalized disclosure..., this is not literal identity." The *Minnesota* court held that the reference's ranges were so broad as to be meaningless, and provided no guidance on how to construct a product with the patented invention's benefits.

As previously argued, none of the cited references singularly or in combination suggest teach or obviate the present invention and indeed cannot be combined. The Examiner has engaged in hindsight application, a prohibited rejection since *John Deere* to combine the cited prior art references against the present invention.

Many of the pore forming grains (starch) can remain trapped in the material after it is cured and after the material washing, only releasing in use, which causes contamination of the process. This makes for a much dirtier sponge. See the discussion in Bahten '662 below which uses starch as the pore former. When this product is formed, both sponge and starch combine to make a surface skin. This skin requires that the liquid flow pressure be greater to push the cleaning solution through the brush/roller. This results in higher chemistry (water and chemicals) usage and greater stress and breakdown of the skin material resulting in a shorter use life.

The Bahten '662 patent (assigned to Rippey Corporation) is primarily directed toward a cleaning device for PVA brushes. Bahten '662 specifically states that the pore size in some embodiments ranges from about 10 microns to about 200 microns and where the average pore size is less than 10 microns the material may have poor elasticity making the performance fo the cleaning roll unsatisfactory. Bahten is silent about the uniformity and size distribution of the pores. The production of Bahten '662 requires adding a starch to form the pores. It is also noted that other competitive brushes have more impurities. **Of significant interest is the listing on Col 7 lines 35 -44 of Bahten '662 which notes that the rollers of Merocel Scientific Products (Cercone et al.**

‘573) include a wide variety of impurities that can be detrimental to the manufacture of integrated circuits. As noted on Col. 7 lines 33,34, the Bahten ‘662 process has a first step providing a plurality of porous polymeric devices which require cleaning. **These are products which have just been manufactured.** Because Bahten ‘662 uses starch twelve additional complex cleaning steps are required to remove particulate contamination and impurities from the porous polymeric devices. The devices are noted as being “dirty” from the manufacturing process and should be substantially cleaned before use in the manufacturing operation, e.g. semiconductor fabrication. After cleaning a preservative is added such as ammonium hydroxide or other organic biocide and the roller is then packaged. After the cleaning steps are accomplished, the product still contains a number of impurities which seriously impact on its product life and defect ratio of silicone wafers. This twelve step requirement is specifically pointed out to show that the product of Bahten ‘662 is inherently dirty which means that substantial impurities would remain after washing as the impurities are held in the foam during curing. Test results show that such problems are still in existence.

It is thus seen that the cited references do not teach or obviate the present invention and cannot be combined as they use different pore forming techniques in the PVA. The invention because of its specific range of pore sizes and fluid flow characteristics has a life span more than double the rollers presently being used in the marketplace, uses $\frac{1}{2}$ the chemicals and water currently being used by rollers in the field which are used in the marketplace and has a negative defect rate. As previously noted the inventive rollers when cleaning the silicone wafers do not cause defects as do other competitive rollers but additionally cure manufacturing defects which occur in the production of the silicone wafers. These are solutions to a long felt need in the industry and are totally unexpected and are surprising results which save large quantities of products, save a significant amount of money in a multibillion dollar industry and have significant environmental benefits.

Applicant would note that there is no basis for the Examiners assertion that Bahten 662 is taught “bubble point pressure” or “mean flow pore pressure” “cleaning solvent flow rate through the roller” or “dry flow rate” or that the same are accomplished by practicing the prior art. The uniform pore size and porosity is not disclosed by Bahten ‘662 and the products have not been shown to be identical or substantially identical in structure or that are produced by identical or substantially identical processes. Under this assertion all steel products containing iron are the same

as would be all plastic products having a base polymer structure. It is also not obvious to reduce formaldehyde to the levels of the present invention. The phrase substantially free from impurities does not teach removing the residual formaldehyde to less than 0.1ppm. Such rejections are pure hindsight rejections based on supposition and not the prior art.

A three month extension of time together with the fee is attached. If any additional charges are required, please charge Deposit Account Number 07-1340.

It is respectfully requested that the arguments and amendments present in the present application in condition for favorable reexamination and that the application be passed to issue.

Respectfully submitted,

GIPPLE & HALE

John S. Hale
Registration No. 25,209

6665-A Old Dominion Drive
McLean, Virginia 22101
(703) 448-1770 ext. 304
Attorney Reference: X-9449